

# PERCO ENGINEERING, PC

Professional Services Corporation

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AUG 21 2013

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## **SUBMITTAL:**

Date: August 20, 2013  
To: Bruce Dees & Associates

Subject: Wellington Hills Onsite Septic and Soils Feasibility

Attn.: Bruce

## **TRANSMITTING.:**

- 1) Report (Stamped 8/19/13) Feasibility, preliminary field sizing & design, Appendices & references



Dan Parrent P.E.

# *Onsite Septic System Feasibility*

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August 19, 2013

**PERCO Job #13017**



**Designer/Developer:**

Snohomish Parks & Recreation  
c/o Bruce Dees & Associates  
222- 26<sup>th</sup> St #202  
Tacoma, WA. 98421  
Ph: (253) 627-7947

**Prepared by :**

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Date: August 19, 2013

Bruce Dees & Associates  
222 E. 26<sup>th</sup> St. #202  
Tacoma, WA 98421  
Ph: (360) 627-7947

Re:  
Wellington Hills County Park  
Onsite Septic Feasibility  
South Snohomish County Woodinville area

## **INTRODUCTION**

This is a feasibility report for a proposed onsite septic system serving a new BMX bicycle- park on the old Wellington Golf course site. The parcel is adjacent to 240<sup>th</sup> St SE and 71st Dr SE near Woodinville, WA. The project is not within the incorporated city boundary and is not currently served by the city sewer system, although it is connected to the city water. Site plans for the Snohomish Parks and Recreation Department include 7 soccer/ ball fields and associated parking, an indoor BMX park, pedestrian trails, and a future Community center.

Soil type, depth, and classification has been identified in a geological investigation report prepared by Snohomish County Public Works Tom Teigen of the Snohomish Parks and Recreation Department (county record reference #RR9291-101-37).

### *General Soils Description*

Generally the soils are described as a brown Silty Sand and Gravel at depths of over 3' with slight mottling, underlain by denser gray Fine Silty Sand and Gravel at 3' to 6'. The upper horizon of the 3' depth soils were slightly wet due given the wet season investigation, while at depths over 3' occasional saturated conditions were observed. The soils appear to have a reasonable permeability and percolation rate conducive to an onsite septic system.

These can be described as a Type 4 soils with a hydraulic loading rate of 0.6 gpd/sf per per WAC 246-271A-0234 Table VIII. A 0.8 gpd/sf is allowed in Table-5 2007 Subsurface Drip System DOH design guidelines, with the application of a Subsurface Drip Systems (DOH Publication #337-015). Subsurface drip systems often used for commercial applications with depth to impervious layers of 3' to 2' with waivers. These systems work well for equal distribution of effluent over a large field area when applied at smaller and more frequent dosing intervals.

Note:  
Soil determination and depth to water table must be verified by with a Washington Department of Heath representative prior to approval for any large onsite septic system (LOSS) design (WAC 246-272A-0234). Order of items for required for approval can be identified in the Washington

Department of Health, LOSS approval Process Chart.

### *Effluent Volume Estimate*

Preliminary site plans designate approximately 730 parking spaces. Given peak usage for available parking, a preliminary estimate assumes 5 gallon per capita day with 2 people per car for a total of 7300 gallon per day effluent volume (See Table 1-B of the EPA design flows).

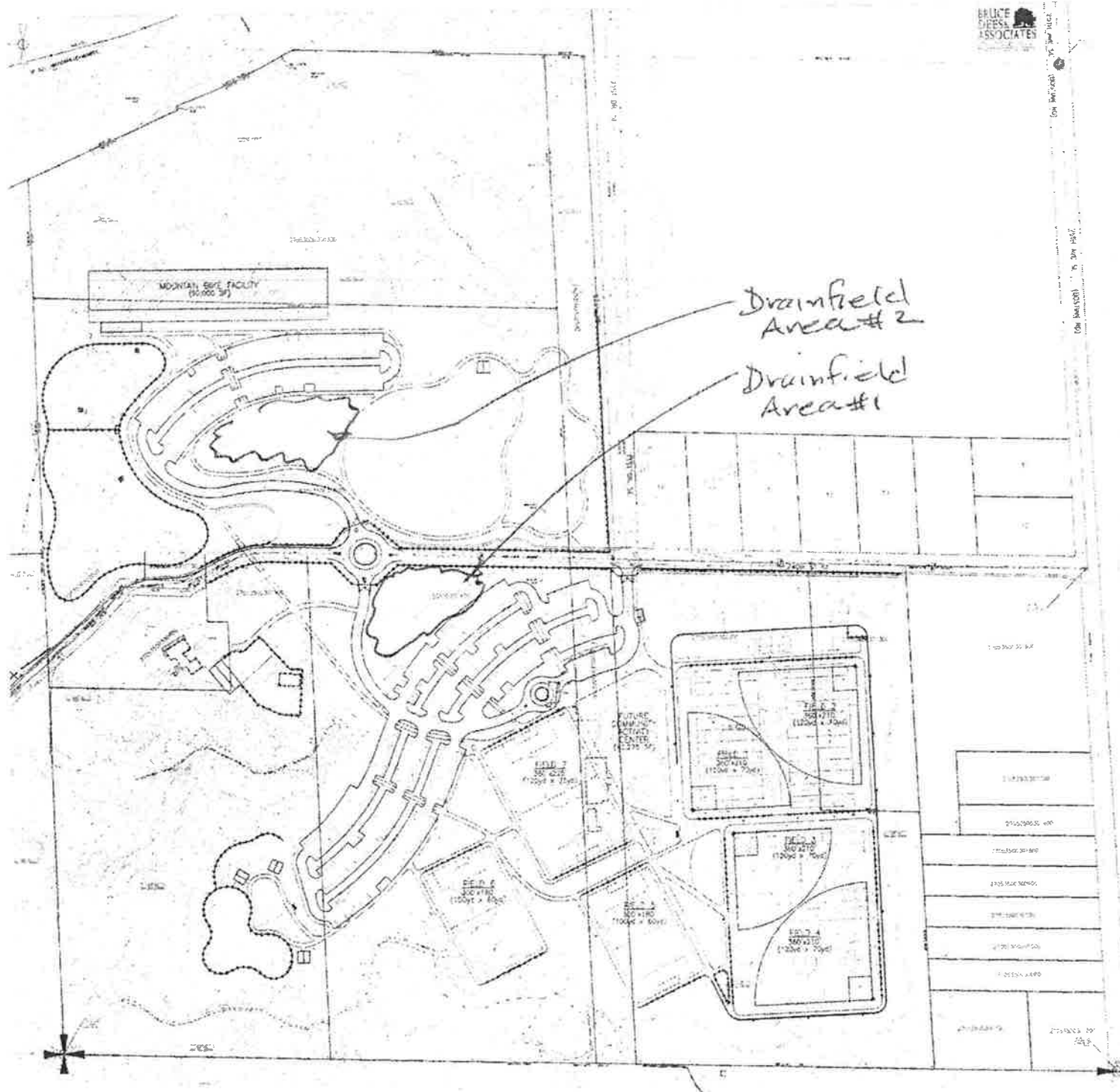
Incorporation of the subsurface drip "Geoflow" Software results show two zones 16'x143' will be adequate for the primary field area. An additional zone is called for as an alternating field to be rotated at 3 to 6 months intervals. The primary zones will be dosed 12 times daily each for a total of 24 doses. A redundant reserve 25'x143' is required per code.

A high head 1 hp well pump Hydromatic HE 35-12 or equal is recommended.

### **Conclusion:**

Based upon the preliminary soils report and architectural site plans, an onsite septic system **is feasible** for this project. Final determination of soil properties must be confirmed by the State Department of Health.

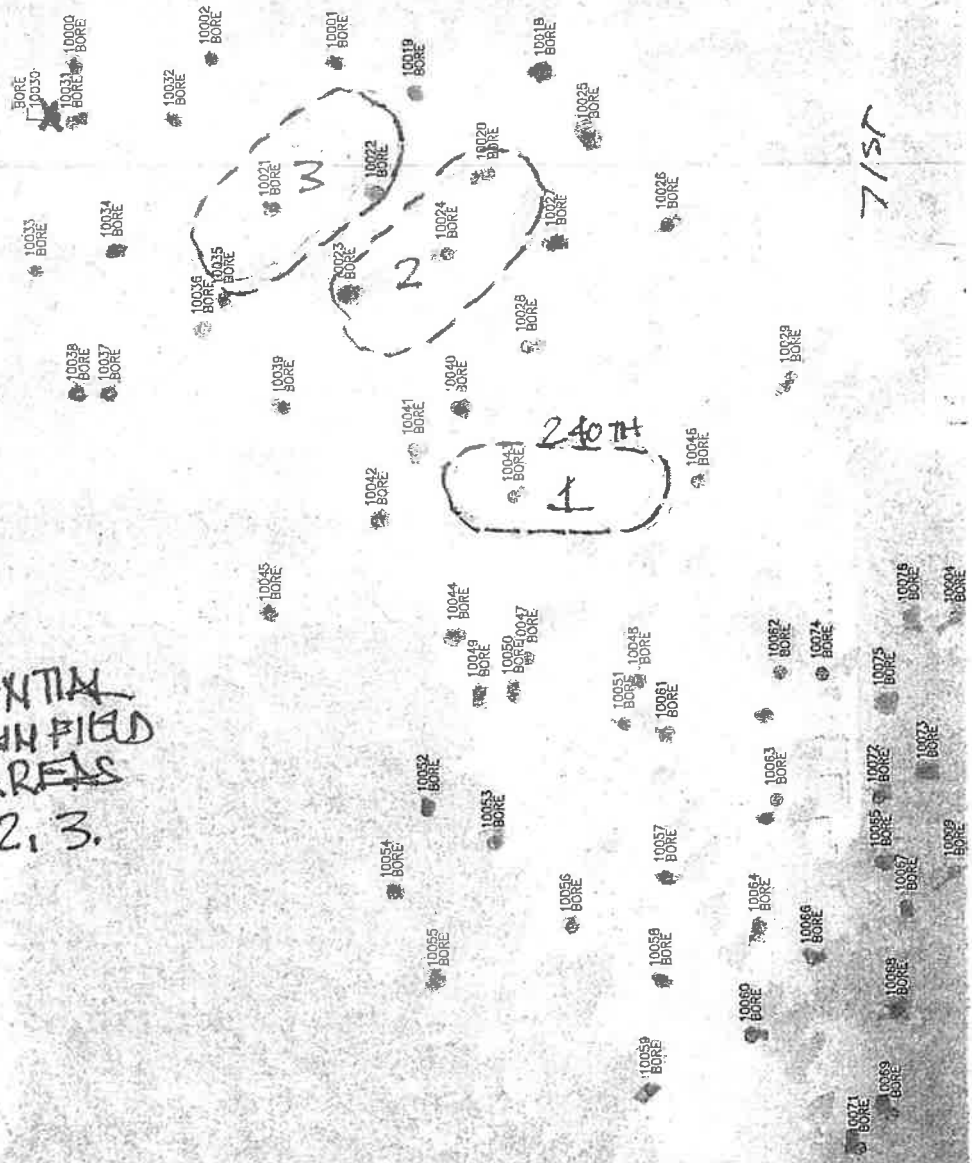
Dan Parrent P.E.



POTENTIAL  
DRAIN FIELD  
AREAS  
1, 2, 3.

↑  
NORTH

7/5/7



# TEST PIT LOGS

## TEST PIT LOG TP-45

Notes	Depth (feet)	Description
Test pit logged by an engineering geologist from SCPW as materials were excavated. Soil descriptions were developed in accordance with ASTM D2488 and following the Unified Soil Classification system.	0.0 - 0.3'	<b>Topsoil</b> ; Brown, poorly developed ( <i>pt</i> ).
	0.3 - 3.5'	<b>Silty Sand and Gravel</b> ; Red brown, mottled, fine- to medium-grained, trace organics, medium dense, wet to saturated ( <i>sm, weathered Glacial Till - Qvt</i> ). 2.5 - 3.5' moderate seepage, sloughing
	3.5 - 9.0'	<b>Silty Sand and Gravel</b> ; Gray brown, slightly mottled, fine- to coarse-grained, with local lenses of fine-grained sand, very dense, wet to saturated ( <i>sm, Glacial Till - Qvt</i> ). 6.0 - 9.0' heavy seepage, sloughing
	Total Depth = 9.0 feet bgs	
	Survey Point 10041	

## TEST PIT LOG TP-46

Notes	Depth (feet)	Description
Test pit logged by an engineering geologist from SCPW as materials were excavated. Soil descriptions were developed in accordance with ASTM D2488 and following the Unified Soil Classification system.	0.0 - 0.5'	<b>Topsoil</b> ; Dark brown, well developed ( <i>pt</i> ).
	0.5 - 3.5'	<b>Silty Sand and Gravel</b> ; Red brown, mottled, fine- to coarse-grained, trace cobbles, medium dense, wet to saturated ( <i>sm, weathered Glacial Till - Qvt</i> ). 2.5 - 3.5' moderate seepage, sloughing
	3.5 - 8.0'	<b>Silty Sand and Gravel</b> ; Gray brown, slightly mottled, fine- to coarse-grained, dense to very dense, wet ( <i>sm, Glacial Till - Qvt</i> ).
	Total Depth = 8.0 feet bgs	
	Survey Point 10043	

- DRAINAGE  
AREA #1

Snohomish County  
Public Works



PROJECT: Wellington Hills County Park

NUMBER: RR9291-101-37  
DATE: 11/29/12

# TEST PIT LOGS

## TEST PIT LOG TP-65

Notes	Depth (feet)	Description
Test pit logged by an engineering geologist from SCPW as materials were excavated. Soil descriptions were developed in accordance with ASTM D2488 and following the Unified Soil Classification system.	0.0 - 0.6'	<b>Topsoil</b> ; Dark brown, well developed ( <i>pt</i> ).
	0.6 - 3.0'	<b>Silty Sand and Gravel</b> ; Red brown, mottled, fine- to coarse-grained, trace organics, trace cobbles, medium dense, wet to saturated ( <i>sm</i> , <i>weathered Glacial Till - Qvt</i> ).
	2.0 - 3.0'	heavy seepage, sloughing
	3.0 - 8.0'	<b>Silty Sand and Gravel</b> ; Gray brown, slightly mottled, fine- to coarse-grained, trace cobbles, dense to very dense, wet to saturated ( <i>sm</i> , <i>Glacial Till - Qvt</i> ).
	3.5 - 7.5'	heavy seepage, sloughing
		Total Depth = 8.0 feet bgs, refusal Survey Point 10024

#2

## TEST PIT LOG TP-66

Notes	Depth (feet)	Description
Test pit logged by an engineering geologist from SCPW as materials were excavated. Soil descriptions were developed in accordance with ASTM D2488 and following the Unified Soil Classification system.	0.0 - 0.7'	<b>Topsoil</b> ; Dark brown, well developed ( <i>pt</i> ).
	0.7 - 3.0'	<b>Silty Sand and Gravel</b> ; Red brown, mottled, fine- to coarse-grained, trace organics, trace cobbles, medium dense, wet to saturated ( <i>sm</i> , <i>weathered Glacial Till - Qvt</i> ).
	2.0 - 3.0'	moderate seepage
	3.0 - 7.0'	<b>Silty Sand and Gravel</b> ; Gray brown, slightly mottled, fine- to coarse-grained, trace cobbles, very dense, damp ( <i>sm</i> , <i>Glacial Till - Qvt</i> ).
		Total Depth = 7.0 feet bgs, refusal Survey Point 10020

DAVIDSON APEL  
#2

Snohomish County  
Public Works



PROJECT: Wellington Hills County Park

NUMBER: RR9291-101-37  
DATE: 12/11/12



# TEST PIT LOGS

## TEST PIT LOG TP-49

Notes	Depth (feet)	Description
Test pit logged by an engineering geologist from SCPW as materials were excavated. Soil descriptions were developed in accordance with ASTM D2488 and following the Unified Soil Classification system.	0.0 - 0.9'	<b>Topsoil</b> ; Dark brown, well developed (pt).
	0.9 - 3.1	<b>Sandy Silt to Silty Sand with Gravel</b> ; Red brown, mottled, fine- to coarse-grained, trace organics, trace cobbles, medium dense, moist to wet (sm, weathered Glacial Till - Qvt).
	3.1 - 8.5'	<b>Silty Sand and Gravel</b> ; Gray brown, mottled, fine- to coarse-grained, trace cobbles, dense to very dense, wet to saturated (sm, Glacial Till - Qvt).
	3.5 - 5.0'	slight seepage, sloughing
	Total Depth = 8.5 feet bgs Survey Point 10040	

## TEST PIT LOG TP-50

Notes	Depth (feet)	Description
Test pit logged by an engineering geologist from SCPW as materials were excavated. Soil descriptions were developed in accordance with ASTM D2488 and following the Unified Soil Classification system.	0.0 - 0.7'	<b>Topsoil</b> ; Dark brown, well developed (pt).
	0.7 - 3.0'	<b>Silty Sand to Sandy Silt with Gravel</b> ; Red brown, mottled, fine- to coarse-grained, trace cobbles, trace organics, medium dense, wet (sm-mI, weathered Glacial Till - Qvt).
	3.0 - 7.5'	<b>Silty Sand with Gravel</b> ; Gray brown, slightly mottled, fine- to coarse-grained, trace cobbles, very dense, wet to saturated (sm, Glacial Till - Qvt).
	3.5 - 6.0'	slight seepage
	Total Depth = 7.5 feet bgs, refusal Survey Point 10023	

DAVID M. DAW  
P 2

Snohomish County  
Public Works



PROJECT: Wellington Hills County Park

NUMBER: RR9291-101-37  
DATE: 12/11/12

# TEST PIT LOGS

## TEST PIT LOG TP-61

Notes	Depth (feet)	Description
Test pit logged by an engineering geologist from SCPW as materials were excavated. Soil descriptions were developed in accordance with ASTM D2488 and following the Unified Soil Classification system.	0.0 - 0.9'	<b>Topsoil</b> ; Dark brown, well developed (pf).
	0.9 - 3.5'	<b>Silty Sand and Gravel</b> ; Red brown, mottled, fine- to coarse-grained, trace organics, trace cobbles, medium dense, wet to saturated (sm, weathered Glacial Till - Qvt). 2.5 - 3.5' slight seepage, sloughing
	3.5 - 6.5'	<b>Silty Sand and Gravel</b> ; Gray brown, slightly mottled, fine- to coarse-grained, trace cobbles, very dense, wet (sm, Glacial Till - Qvt).
	6.5 - 8.0'	<b>Sand</b> ; Gray brown, very fine- to medium-grained, very dense, damp (sp, Transitional Beds - Qtb?).
	Total Depth = 8.0 feet bgs Survey Point 10002	

## TEST PIT LOG TP-62

Notes	Depth (feet)	Description
Test pit logged by an engineering geologist from SCPW as materials were excavated. Soil descriptions were developed in accordance with ASTM D2488 and following the Unified Soil Classification system.	0.0 - 0.5'	<b>Topsoil</b> ; Dark brown, well developed (pf).
	0.5 - 3.5'	<b>Silty Sand and Gravel</b> ; Red brown, mottled, fine- to coarse-grained, trace organics, trace cobbles, medium dense, wet to saturated (sm, weathered Glacial Till - Qvt). 2.5 - 3.5' moderate seepage, sloughing
	3.5 - 9.0'	<b>Silty Sand and Gravel</b> ; Gray brown to blue gray, slightly mottled, fine- to coarse-grained, trace cobbles, very dense, moist (sm, Glacial Till - Qvt).
	Total Depth = 9.0 feet bgs, refusal Survey Point 10021	
	DRAIN PILE AREA #3	

Snohomish County  
Public Works



PROJECT: Wellington Hills County Park

NUMBER: RR9291-101-37  
DATE: 12/11/12

# TEST PIT LOGS

## TEST PIT LOG TP-51

Notes	Depth (feet)	Description
Test pit logged by an engineering geologist from SCPW as materials were excavated. Soil descriptions were developed in accordance with ASTM D2488 and following the Unified Soil Classification system.	0.0 - 0.7'	<b>Topsoil</b> ; Dark brown, well developed (pf).
	0.7 - 3.5'	<b>Silty Sand with Gravel</b> ; Red brown, mottled, fine- to coarse-grained, trace organics, trace cobbles, medium dense, damp to moist (sm, weathered Glacial Till - Qvf).
	3.5 - 6.0'	<b>Silty Sand with Gravel</b> ; Gray brown, slightly mottled, fine- to coarse-grained, trace cobbles, dense to very dense, wet to saturated (sm, Glacial Till - Qvf). 3.5 - 5.0' localized slight seepage out of sand lenses
	Total Depth = 6.0 feet bgs Survey Point 10039	

## TEST PIT LOG TP-52

Notes	Depth (feet)	Description
Test pit logged by an engineering geologist from SCPW as materials were excavated. Soil descriptions were developed in accordance with ASTM D2488 and following the Unified Soil Classification system.	0.0 - 0.7'	<b>Topsoil</b> ; Dark brown, well developed (pf).
	0.7 - 3.0'	<b>Silty Sand with Gravel</b> ; Red brown, slightly mottled, fine- to coarse-grained, trace organic, trace cobbles, medium dense, damp to moist (sm, weathered Glacial Till - Qvf).
	3.0 - 6.5'	<b>Silty Sand with Gravel</b> ; Gray brown, slightly mottled, fine- to coarse-grained, trace cobbles, dense to very dense, wet to saturated (sm, Glacial Till - Qvf). 3.0 - 5.0' moderate seepage, sloughing
	Total Depth = 6.5 feet bgs, refusal Survey Point 10035	

Snohomish County  
Public Works



PROJECT: Wellington Hills County Park

NUMBER: RR9291-101-37  
DATE: 12/11/12

DRAINAGE AREA  
#3



**GEOFLOW**  
CURB/SIDE/FADE DRIP

## Field Flow

Job Description:	Wellington Hills Design#3
Contact:	Perco Engineering, PC 360-629-6710
Prepared by:	Dan Parrent, PE
Date:	24-Jul-09

### Worksheet 1- Field Flow

#### Total field

Total Quantity of effluent to be disposed per day	7,300	gallons / day
Hydraulic loading rate	0.8	gallons / sq.ft. / day
Minimum Dispersal Field Area	9,125	square ft.
Total Dispersal Field Area	9,125	square ft.

#### Flow per zone

Number of Zones	2	zone(s)
Dispersal area per zone	4,563	square ft.
Choose line spacing between WASTEFLOW lines	2	ft.
Choose emitter spacing between WASTEFLOW emitters	2	ft.
Total linear ft. per zone (minimum required)	2,281	ft. per zone
Total number of emitters per zone	1,141	emitters per zone
Select Wasteflow dripline (16mm)	Wasteflow PC - 1 gph	dripline
Pressure at the beginning of the dripfield	25	psi
Feet of Head at the beginning of the dripfield	57.75	ft.
What is the flow rate per emitter in gph?	1.02	gph
Dose flow per zone	19.39	gpm

Note: A few States or Counties require additional flow for flushing. Please check your local regulations. Flush velocity calculation below is for PC dripline. Classic dripline requires less flow to flush than P-G. Please refer to Geoflow's spreadsheet "Design Flow and Flush Curves" at [www.geoflow.com](http://www.geoflow.com) or call 800-8

If required, choose flush velocity	0.5	ft/sec
How many lines of WASTEFLOW per zone?	16	lines
Fill in the actual length of longest dripline lateral	143	ft.
Flush flow required at the end of each dripline	0.37	gpm
Total Flow required to achieve flushing velocity	5.92	gpm
Total Flow per zone- worst case scenario	25.31	gpm

#### Select Filters and zone valves

Select Filter Type	Vortex Screen Filter	
Recommended Filter (item no.)	AP4E-1.5F	1.5" Screen Filter 0-45gpm
Select Zone Valve Type	Electric Solenoid	-
Recommended Zone Valve (item no.)	SVLVB-150	1.5-in. Solenoid valve

#### Dosing

Number of doses per day / zone:	12	doses
Timer ON. Pump run time per dose/zone:	15.41	mins:secs
Timer OFF. Pump off time between doses	1:44	hrs:mins
Per Zone - Pump run time per day/zone:	3:08	hrs:mins
All Zones - Number of doses per day / all zones	24	doses / day

730 parking spaces  
2 person per car  
5gpd per person.  
Type 4 soil with drip  
system 0.8 gpd/sf.

Use 2~zones 16'x143'  
& 1~extra alternating  
zone 16'x143'.  
Allow for equivalent  
reserve area 32'x143'.



Job Description:	Wellington Hills Design#3		
Contact:	Perco Engineering, PC 360-629-6710		
Prepared by:	Dan Parrent, PE		
Date:		7/24/2009	

Pressure losses may be grossly overstated, particularly if designing with WASTEFLOW Classic  
The letters on the diagram(right) match the letters in section 2 below.

## Worksheet - Pump Sizing

### Section 1 - Summary from Worksheet 1

Flow required to dose field	19.39	gpm
Flow required to flush field	5.92	gpm
Flow required to dose & flush field	25.31	gpm
Filter	AP4E-1.5F	
No. of Zones	2 zones	
Zone valve	SVLVB-150	
Dripline	Wasteflow PC - 1 gph	
Dripline longest lateral	142.58	ft.

### Section 2

#### A. Flush line - Losses through return line

Size of flush line in inches	1	inch	
Length of return line	100	ft.	
Equivalent length of fittings	5	ft.	
Elevation change. (if downhill enter 0)	0	ft.	
Pressure loss in 100 ft of pipe	3.01	ft.	1.30
Total pressure loss from end of dripline to return tank	3.2	ft.	1.37

#### B. Dripline - Losses through Wasteflow dripline

Length of longest dripline lateral	143	ft.	
Minimum dosing pressure required at end of dripline	23.10	ft.	10.00
Loss through dripline during flushing	9.49	ft.	4.11
Total minimum required dripline pressure	32.59	ft.	4.11

#### A+B. Minimum Pressure required at beginning of dripfield

CALCULATED pressure required at beginning of dripfield	35.75	ft.	15.48
SPECIFIED pressure at beginning of dripfield (from worksht 1)	57.8	ft.	25.00
Great! SPECIFIED Pressure is greater than CALCULATED Pressure requirement. Go to next step			

#### C. Drip components - Losses through headworks

Filter	6.9	ft.	3.00
Zone valve pressure loss (not in diagram)	1.16	ft.	0.50
Flow meter pressure loss (not in diagram)		ft.	-
Other pressure losses		ft.	-
Total loss through drip components	8.09	ft.	3.50

#### D. Supply line - Minimum Pressure head required to get from pump tank to top of dripfield

Size of supply line in inches	1.5	inch	
Length of supply line	100	ft.	
Equivalent length of fittings	5	ft.	
Height from pump to tank outlet	5	ft.	
Elevation change. (if downhill enter 0)	10	ft.	
Pressure loss/gain in 100 ft. of pipe	6.17	ft.	2.67
Total gain or loss from pump to field	21.5	ft.	9.30
Total dynamic head	87.3	ft.	37.80
Pump capacity *	25.3	gpm	
Pump Model Number	Hydromatic HE 35-12		
Voltz / Hp / phase	230V-9.8 A, 1HP, Single		

\* Note: Pump capacity flow assumes flow in dripline does not change during a dose cycle. V  
For more accurate flows please see Geoflow's **Flushing worksheet**.

If you need assistance designing for this additional flow, please

a. See Geoflow flushing worksheet or

b. Contact Geoflow at 800-828-3388.

# **APPENDIX**

# Performance Data

HE8/HE12/HE20/HE25  
HE30/HE35/HE50

Wholesale Products Page: 6650-1

Section: Performance Data

Dated: June 2007

RPM: **3450**

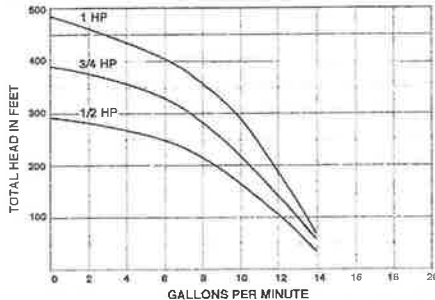
Discharge: \*

Solids: **1/16"**

## High Head Filtered Effluent Pumps

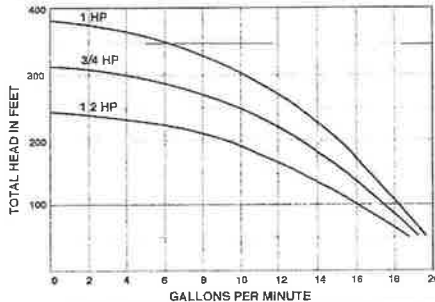
### 8 GPM

\*Discharge Size 1-1/4" NPT



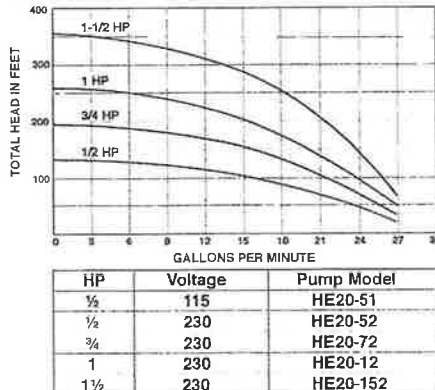
### 12 GPM

\*Discharge Size 1-1/4" NPT



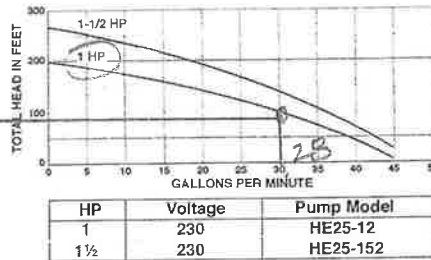
### 20 GPM

\*Discharge Size 1-1/4" NPT



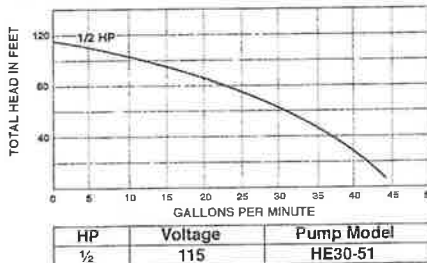
### 25 GPM

\*Discharge Size 2" NPT



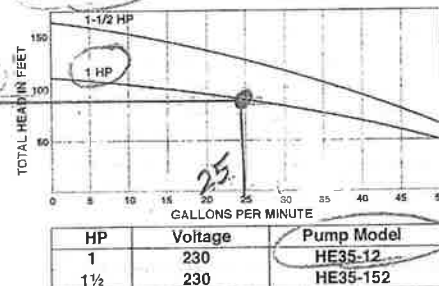
### 30 GPM

\*Discharge Size 1-1/4" NPT



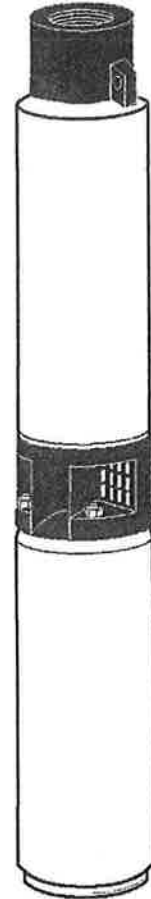
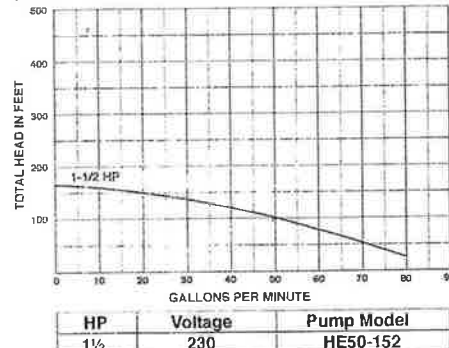
### 35 GPM

\*Discharge Size 2" NPT



### 50 GPM

\*Discharge Size 2" NPT



The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

Conditions of Service:

GPM: \_\_\_\_\_ TDH: \_\_\_\_\_

**HP HYDROMATIC®**

Table 1-B.

Design Flows for Facilities Other than Residential Development  
(Reference 8)

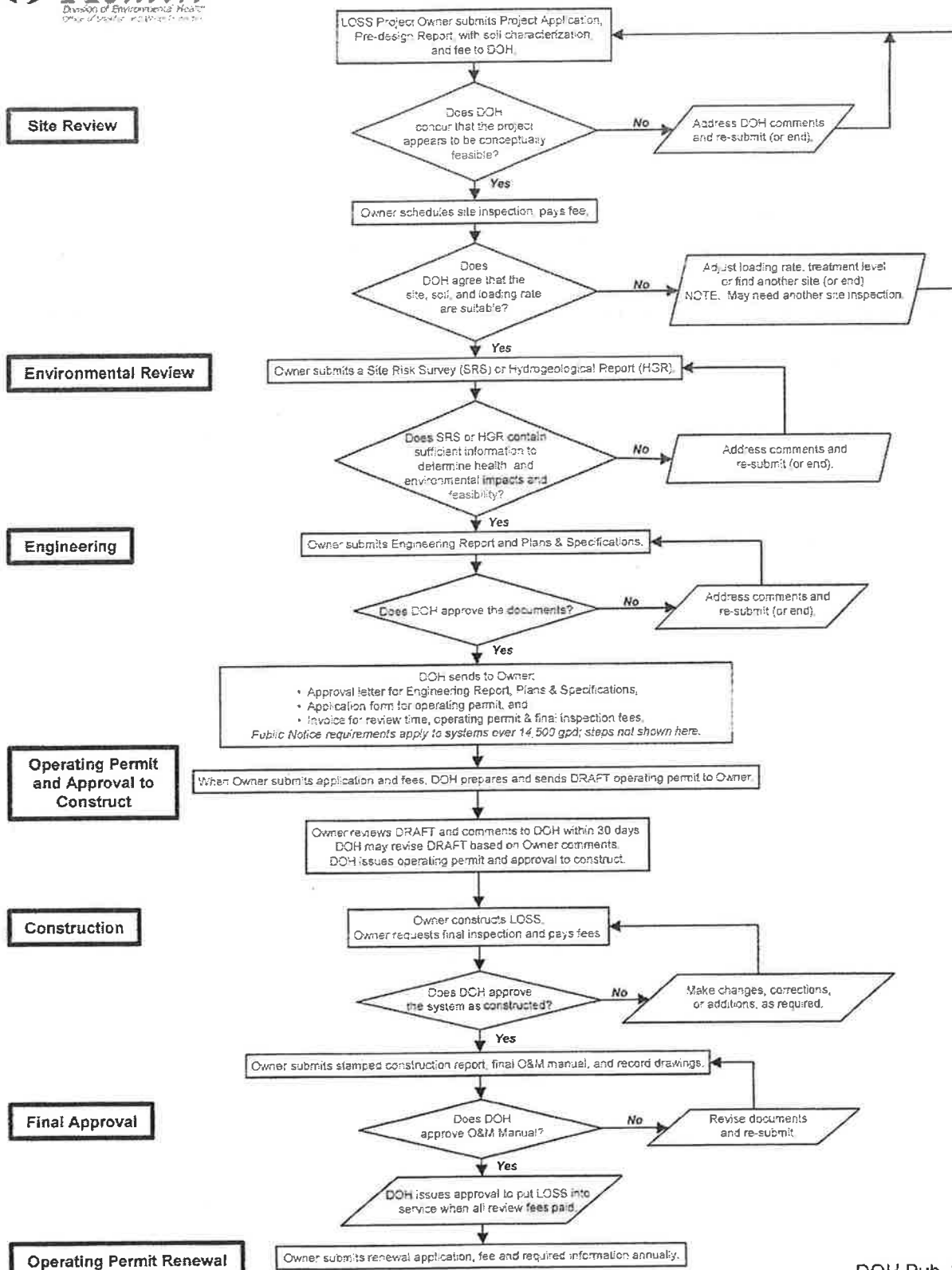
Discharge Facility	Design Units	Peak Flow** Flow** (gpd)	Flow Duration (hr)
Schools with showers and cafeteria	per person	16	8
Schools without showers and with cafeteria	per person	12.6	8
Schools without showers and without cafeteria	per person	10	8
Boarding schools	per person	75	16
Motels at 65 gal/person (rooms only)	per room	130	24
Restaurants*	per seat	50	16
Interstate or through highway restaurants*	per seat	180	16
Interstate rest areas	per person	5	24
Service stations	per vehicle served	10	16
Factories(showers)	per person per 8-hr shift	25	Operating Period
Factories(no showers)	per person per 8-hr shift	15	
Shopping centers*	per 1,000 sq ft of ultimate floor space	200-300	12
Hospitals*	per bed	300	24
Nursing homes*	per bed	200	24
Homes for the aged*	per bed	100	24
Doctor's office in medical center*	per 1,000 ft	500	12
Laundromats	per machine	500	16
Community colleges	per student and faculty	15	12
Swimming pools	per swimmer	10	12
Theaters, drive-in type	per car	5	4
Theaters, auditorium type	per seat	5	12
Churches (no kitchen)	per seat	3	4
Churches (with kitchens)	per seat	5	4
Day Care Centers	per person	20	12
Picnic areas	per person	5	12
Campgrounds, with limited comfort stations	per camp site	50	24
No laundry, no wet sewer hookup			
Campgrounds/RV parks, with flush toilets	per camp site	75	24
showers,laundry, no wet sewer hookup			
Campgrounds/RV Parks, with flush toilets, showers, with or without laundry facilities and wet sewer hookup	per camp site	100	24
Campgrounds/RV Parks with wet sewer hookup only, no comfort station	per camp site	50	24
Trailer Dump Stations*	per dump	20	24

\* Indicates potential high waste strengths facilities requiring pre-treatment

\*\* Includes normal infiltration



## Large On-site Sewage System (LOSS) New Project Review & Approval Process Flowchart



*Recommended Standards and Guidance for  
Performance, Application, Design, and Operation & Maintenance*

# **Subsurface Drip Systems**

July 2007



For information or additional copies of this report contact:  
Wastewater Management Program  
Physical address: 111 Israel Road SE, Tumwater, WA 98501  
Mailing Address: PO Box 47824, Olympia, Washington 98504-7824

Tel: 360.236.3062  
FAX: 360.236.2257  
Webpage: <http://www.doh.wa.gov/wastewater.htm>

Mary Selecky  
Secretary of Health

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To submit a request, please call 1-888-586-9427 (TDD/TTY 1-800-833-6388).

Para personas discapacitadas, este documento está disponible a su pedido en otros formatos.

Para hacer su pedido llame al 1-888-586-9427 (TDD/TTY 1-800-833-6388).

DOH Publication #337-015

- 2.2.4. To obtain a permit designers must submit an application acceptable to the local health jurisdiction addressing (at a minimum) items outlined in WAC 246-272A-0200.

### 2.3. Siting Conditions

- 2.3.1. A soil /site evaluation is required in accordance with state code (see WAC 246-272A-0220 to determine site suitability for SDS.
- 2.3.2. SDS may be located wherever pressure distribution is allowed or required.
- 2.3.3. The level of pretreatment determines the minimum vertical separation requirements in accordance with WAC 246-272A (at least 2 feet of unsaturated, undisturbed soil beneath the installed dripline is required where only minimum pretreatment is provided).
- 2.3.4. To obtain a permit for new construction the designer must demonstrate that sufficient suitable area exists to construct 100% of the primary and reserve dripfield. For single-family residences the minimum constructed area depends on pretreatment. For primary and reserve area requirements see Table 2. Primary and reserve area requirements for multi family and other commercial applications can be determined by applying the formulas in Table 5.
- 2.3.5. Minimum horizontal separations from SDS components are consistent with separations to conventional on-site system components identified in state code (see Table 1).

*NOTE: For SDS "edge of dispersal component" means the location of the nearest dripline to the item requiring the setback.*

### 2.4. Influent Characteristics

- 2.4.1. SDS may be utilized to distribute either *greywater* or combined wastewater (combined wastewater means *greywater* and *blackwater*).
- 2.4.2. SDS designed and installed in accordance with manufacturer's recommendations and consistent with these standards are suitable for treatment and dispersal of *residential sewage*.

### 2.5. Pretreatment

- 2.5.1. The proposed use, site and soil conditions will determine the degree of pretreatment necessary. Different SDS products may require different levels of

## Appendix A - Tables

**Table 1. Minimum Horizontal Separations**

Items Requiring Setback	From edge of soil dispersal component and reserve area <sup>3</sup>	From sewage tank and distribution box	From building sewer, and nonperforated distribution pipe
Well or suction line	100 ft.	50 ft.	50 ft.
Public drinking water well	100 ft.	100 ft.	100 ft.
Public drinking water spring measured from the ordinary high-water mark	200 ft.	200 ft.	100 ft.
Spring or surface water used as drinking water source measured from the ordinary high-water mark <sup>1</sup>	100 ft.	50 ft.	50 ft.
Pressurized water supply line	10 ft.	10 ft.	10 ft.
Decommissioned well (decommissioned in accordance with chapter 173-160 WAC)	10 ft.	N/A	N/A
Surface water measured from the ordinary high-water mark	100 ft.	50 ft.	10 ft.
Building foundation/in-ground swimming pool	10 ft.	5 ft.	2 ft.
Property or easement line	5 ft.	5 ft.	N/A
Interceptor/curtain drains/foundation drains/drainage ditches			
Down-gradient <sup>2</sup> :	30 ft.	5 ft.	N/A
Up-gradient <sup>2</sup> :	10 ft.	N/A	N/A
Other site features that may allow effluent to surface			
Down-gradient <sup>2</sup> :	30 ft.	5 ft.	N/A
Up-gradient <sup>2</sup> :	10 ft.	N/A	N/A
Down-gradient cuts or banks with at least 5 ft. of original, undisturbed soil above a restrictive layer due to a structural or textural change	25 ft.	N/A	N/A
Down-gradient cuts or banks with less than 5 ft. of original, undisturbed soil above a restrictive layer due to a structural or textural change	50 ft.	N/A	N/A
Other adjacent soil dispersal components /subsurface storm water infiltration systems	10 ft.	N/A	N/A

<sup>1</sup>If surface water is used as a public drinking water supply, the designer shall locate the OSS outside of the required source water protection area.

<sup>2</sup>The item is down-gradient when liquid will flow toward it upon encountering a water table or a restrictive layer. The item is up-gradient when liquid will flow away from it upon encountering a water table or restrictive layer.

**Table 4. Maximum Emitter Discharge Rates by Soil Type (gallons per hour)**

WA Soil Type	1, 2	3	4	5	6
Geoflow Dripline with PC emitters	1.02	1.02	0.53	0.53	0.53
Geoflow "Classic" Dripline (non PC emitters)	1.33	1.33	Not recommended	Not recommended	Not recommended
Netafim Dripline	0.92	0.92	0.62	0.62	0.42

**Table 5. Primary Drip Design Parameters (non residential applications)<sup>1</sup>**

WA Soil Type	1,2	3	4	5	6 <sup>2</sup>
Maximum daily discharge per emitter (gpd / emitter)	1	0.8	0.8	0.5	0.25
Minimum emitter spacing (ft)	1	1	1	1	1
Minimum dripline spacing (ft)	1	1.5	2	2	2
Minimum area per emitter (ft <sup>2</sup> )	1	1.5	2	2	2

<sup>1</sup>TABLE VALUES APPLY REGARDLESS OF PRETREATMENT

<sup>2</sup>On site systems with design flows of 1000 gpd or greater are only allowed in soil types 1-5, or on sites with slopes less than 30 percent.

To use this table: Divide total design flow of the system by the value shown for maximum daily discharge per emitter (top row) to determine minimum number of emitters required and multiply the number of emitters required by the value in the bottom row (minimum area per emitter) to determine minimum dripfield area.



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**WAC 246-272A-0234**
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**Design requirements—Soil dispersal components.**

(1) All soil dispersal components, except one using a subsurface dripline product, shall be designed to meet the following requirements:

(a) Maximum hydraulic loading rates shall be based on the rates described in Table VIII;

TABLE VIII  
Maximum Hydraulic Loading Rate

Soil Type	Soil Textural Classification Description	Loading Rate for Residential Effluent Using Gravity or Pressure Distribution gal./sq. ft./day
1	Gravelly and very gravelly coarse sands, all extremely gravelly soils excluding soil types 5 & 6, all soil types with greater than or equal to 90% rock fragments.	1.0
2	Coarse sands.	1.0
3	Medium sands, loamy coarse sands, loamy medium sands.	0.8
4	Fine sands, loamy fine sands, sandy loams, loams.	0.6
5	Very fine sands, loamy very fine sands; or silt loams, sandy clay loams, clay loams and silty clay loams with a moderate structure or strong structure (excluding a platy structure).	0.4
6	Other silt loams, sandy clay loams, clay loams, silty clay loams.	0.2
7	Sandy clay, clay, silty clay and strongly cemented firm soils, soil with a moderate or strong platy structure, any soil with a massive structure, any soil with appreciable	Not suitable

Soil Type	Soil Textural Classification Description	Loading Rate for Residential Effluent Using Gravity or Pressure Distribution gal./sq. ft./day
	amounts of expanding clays.	

- (b) Calculation of the absorption area is based on:
- (i) The design flow in WAC 246-272A-0230(2); and
  - (ii) Loading rates equal to or less than those in Table VIII applied to the infiltrative surface of the soil dispersal component or the finest textured soil within the vertical separation selected by the designer, whichever has the finest texture.
- (c) Requirements for the method of distribution shall correspond to those in Table VI.
- (d) Soil dispersal components having daily design flow between one thousand and three thousand five hundred gallons of sewage per day shall:
- (i) Only be located in soil types 1-5;
  - (ii) Only be located on slopes of less than thirty percent, or seventeen degrees; and
  - (iii) Have pressure distribution including time dosing.
- (2) All soil dispersal components using a subsurface dripline product must be designed to meet the following requirements:
- (a) Calculation of the absorption area is based on:
    - (i) The design flow in WAC 246-272A-0230(2);
    - (ii) Loading rates that are dependent on the soil type, other soil and site characteristics, and the spacing of dripline and emitters;
  - (b) The dripline must be installed a minimum of six inches into original, undisturbed soil;
  - (c) Timed dosing; and
  - (d) Soil dispersal components having daily design flows greater than one thousand gallons of sewage per day may:
    - (i) Only be located in soil types 1-5;
    - (ii) Only be located on slopes of less than thirty percent, or seventeen degrees.
- (3) All SSAS shall meet the following requirements:
- (a) The infiltrative surface may not be deeper than three feet below the finished grade, except under special conditions approved by the local health officer. The depth of such system shall not exceed ten feet from the finished grade;
  - (b) A minimum of six inches of sidewall must be located in original undisturbed soil;
  - (c) Beds are only designed in soil types 1, 2, 3 or in fine sands with a width not exceeding ten feet;
  - (d) Individual laterals greater than one hundred feet in length must use pressure distribution;
  - (e) A layer of between six and twenty-four inches of cover material; and
  - (f) Other features shall conform with the "On-site Wastewater Treatment Systems Manual," United States Environmental Protection Agency EPA-625/R-00/008 February 2002 (available upon request to the department) except where modified by, or in conflict with this section or local regulations.
- (4) For SSAS with drainrock and distribution pipe:
- (a) A minimum of two inches of drainrock is required above the distribution pipe;
  - (b) The sidewall below the invert of the distribution pipe is located in original undisturbed soil.
- (5) The local health officer may allow the infiltrative surface area in a SSAS to include six inches of the SSAS sidewall height when meeting the required absorption area where total recharge by annual precipitation and irrigation is less than twelve inches per year.
- (6) The local health officer may permit systems consisting solely of a septic tank and a gravity SSAS in soil type 1 if all the following criteria are met:
- (a) The system serves a single-family residence;
  - (b) The lot size is greater than two and one-half acres;
  - (c) Annual precipitation in the region is less than twenty-five inches per year as described by "Washington Climate" published jointly by the Cooperative Extension Service, College of Agriculture, and Washington State University (available for inspection at Washington state libraries);
  - (d) The system is located outside the twelve counties bordering Puget Sound; and
  - (e) The geologic conditions beneath the dispersal component must satisfy the minimum unsaturated depth requirements to groundwater as determined by the local health officer. The method for determination is described by "Design Guideline for Gravity Systems in Soil Type 1" (available upon request to the department).
- (7) The local health officer may increase the loading rate in Table VIII up to a factor of two for soil types 1-4 and up to a factor of 1.5 for soil types 5 and 6 if a product tested to meet treatment level D is used. This reduction may not be combined with any other SSAS size reductions.

(8)(a) The primary and reserve areas must be sized to at least one hundred percent of the loading rates listed in Table VIII.

(b) However, the local health officer may allow a legal lot of record created prior to the effective date of this chapter that cannot meet this primary and reserve area requirement to be developed if all the following conditions are met:

(i) The lot cannot meet the minimum primary and reserve area requirements due to the loading rates for medium sand, fine sand and very fine sand listed in Table VIII of this chapter;

(ii) The primary and reserve areas are sufficient to allow installation of a SSAS using maximum loading rates of 1.0 gallons/square foot per day for medium sand, 0.8 gallons/square foot/day for fine sand, and 0.6 gallons/square foot/day for very fine sand; and

(iii) A treatment product meeting at least Treatment Level D and pressure distribution with timed-dosing is used.

[Statutory Authority: RCW 43.20.050. WSR 05-15-119, § 246-272A-0234, filed 7/18/05, effective 7/1/07.]